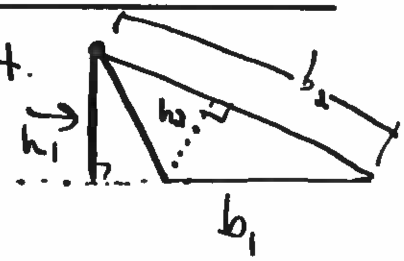
Geometry: Please clear your desk except for...

1. Assignments up to #35
2. SNB - Read over p. 152 in the textbook.



Define: Median and Altitude.
How many Medians and Altitudes does each triangle have?
Which of these two segments must be inside the triangle?
(Draw examples to justify your answer!)

Medians → 3

Always Inside!

Altitudes → 3

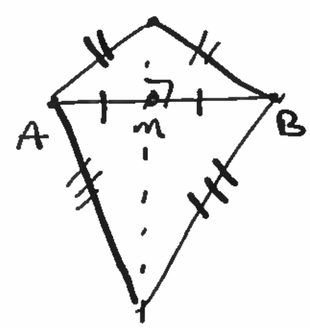
Can be inside
outside
Part

Intro to Section 4.7

Perpendicular Bisector: ⊥ at midpt

① __ ⊥ __ and ② __ is the midpt

Equidistant from two points:

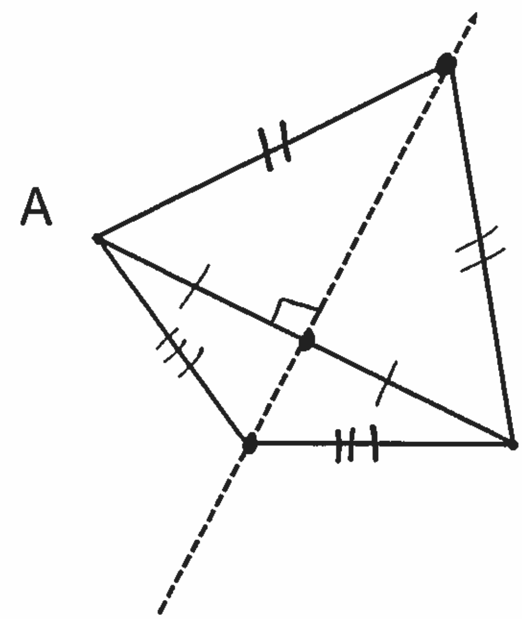


Distance from a point to a line:

Equidistant from two lines:

How many points are equidistant from two points?

Infinitely Many



This leads us to two Theorems:

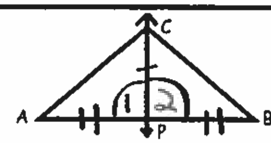
1. If a point lies on the perpendicular bisector of a segment, then the point is equidistant from the endpoints of the segment.

2. If a point is equidistant from the endpoints of a segment, then the points lies on the perpendicular bisector of the segment.

If a point lies on the perpendicular bisector of a segment, then the point is equidistant from the endpoints of the segment.

Given: $\overline{CP}$ is the $\perp$ bisector of $\overline{AB}$

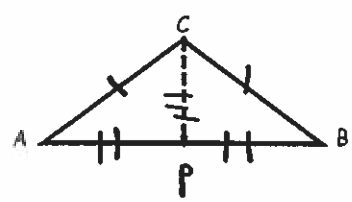
Prove: $CA = CB$



Statements	Reasons
1 $\overline{CP}$ is the $\perp$ bisector of $\overline{AB}$	Given
2 P is the midpt of $\overline{AB}$, $\overline{CP} \perp \overline{AB}$	Def. of $\perp$ bisector
3 $\overline{CP} \cong \overline{CP}$	Refl. Prop. of $\cong$
4 $\overline{AP} \cong \overline{PB}$	Def. of midpoint
5 $\angle 1 \cong \angle 2$	$\perp$ lines form $\cong$ adj. $\angle$s
6 $\triangle APC \cong \triangle BPC$	SAS $\cong$ Post.
7 $\overline{CA} \cong \overline{CB}$	CPCTC
8 $CA = CB$	Def. of $\cong$ seg.

Given: $CA = CB$

Prove: C is on the $\perp$ bisector of $\overline{AB}$



Key Idea: Draw an auxiliary line ($\overline{CP}$).

Triangles are Congruent by:

Option 1: $\overline{CP}$ is an altitude of $\triangle ACB$ [$\perp$ Postulate] — HL $\cong$ Thm

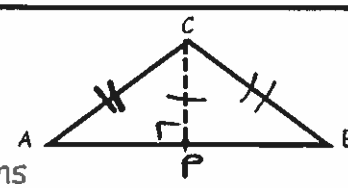
Option 2: $\overline{CP}$ is the $\angle$ bisector of $\angle ACB$ [Every $\angle$ has a bisector] — SAS $\cong$ Post

Option 3: $\overline{CP}$ is a median of $\triangle ACB$ {Every segment has a midpt} — SSS $\cong$ Post

If a point is equidistant from the endpoints of a segment, then the points lies on the perpendicular bisector of the segment.

Given: $CA = CB$

Prove: C is on the $\perp$ bisector of AB



	Statements	Reasons
1	$CA = CB$	Given
2	Draw $\overline{CP} \perp \overline{AB}$	$\perp$ Post
3	$\overline{CP} \cong \overline{CP}$	Refl. Prop. of $\cong$
4	$\overline{CA} \cong \overline{CB}$	Def. of $\cong$ Seg
5	$\triangle ACP \cong \triangle BCP$	HL $\cong$ Thm
6	$\overline{AP} \cong \overline{BP}$	CPCTC
7	P is the midpt of $\overline{AB}$	Def. of midpt
8	C is on the $\perp$ bisector of AB	Def. of $\perp$ bisector
9		

Perpendicular Bisector Theorem:

A point lies on the perpendicular bisector of a segment if and only if the point is equidistant from the endpoints of the segment.

$\overline{AB}$ $\perp$ bisector $\longrightarrow$ $\underline{AP} = \underline{PB}$

$AP = PB$ $\longrightarrow$ P is on the $\perp$ bisector of $\overline{AB}$